

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KUNIO WATANABE and SHOZO TAKEYA

Appeal No. 2002-2274
Application No. 08/387,158

ON BRIEF

Before GARRIS, OWENS, and TIMM, Administrative Patent Judges.
OWENS, Administrative Patent Judge.

DECISION ON APPEAL

This appeal is from the final rejection of claims 33-48 and 51-67. Claims 49 and 50, which are all of the other claims remaining in the application, stand objected to as being dependent from a rejected claim but allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

THE INVENTION

The appellants claim an alloy for a sacrificial anode and claim a metal-reinforced concrete structure comprising a cathodic

protection anode which includes the alloy. Claims 33, 39, 45
and 66 are illustrative:

33. A reinforced concrete structure comprising a cementitious material, metal reinforcement, and a cathodic protection anode, said anode comprising an alloy of about 20% to about 50% Zn, 0.11% to about 0.6% In and the balance Al.
39. A reinforced concrete structure comprising a cementitious material, metal reinforcement, and a cathodic protection anode, said anode consisting essentially of an alloy of about 10% to about 50% Zn, 0.11% to about 0.6% In and the balance Al.
45. An alloy for a sacrificial anode comprising about 20% to about 50% of Zn, 0.11% to about 0.6% In, about 0.0005% to about 0.3% of at least one metal selected from Zr, Si, Ce, Ti, and B, and the balance Al.
66. An alloy for a sacrificial anode consisting essentially of about 10% to about 50% of Zn, 0.11% to about 0.6% In, about 0.02% to about 0.2% of Ce and the balance Al.

THE REFERENCES

Sakano et al. (Sakano)	3,172,760	Mar. 9, 1965
Apostolos	4,506,485	Mar. 26, 1985
Linder et al. (Linder)	4,740,355	Apr. 26, 1988
Kuramoto et al. (JP '637) (Japanese kokai)	2-149637	Jun. 8, 1990
Hanazaki et al. (JP '683) (Japanese kokai)	4-66683	Mar. 3, 1992
Kuramoto (JP '128) (Japanese kokai)	4-157128	May 29, 1992

THE REJECTIONS

The claims stand rejected under 35 U.S.C. § 103 as follows:
claims 33, 34, 39-41, 43, 44, 46-48, 52, 55, 58 and 61 over
Linder or Sakano, in view of Apostolos and the appellants'

admitted prior art; claims 35-38, 42, 45, 51, 53, 54, 56, 57, 59, 60, 62, 64 and 66 over Linder or Sakano, in view of Apostolos, the appellants' admitted prior art, and JP '683, JP '128 or JP '637; and claims 63, 65 and 67 over JP '683.

OPINION

We affirm the rejections over Linder and the prior art applied therewith as to claims 33-45, 51, 53, 54, 56, 57, 59, 60, 62, 64 and 66 and reverse as to claims 46-48, 52, 55, 58 and 61, reverse the rejections over Sakano and the prior art applied therewith, and reverse the rejection over JP '683. Under the provisions of 37 CFR § 1.196(b) we enter new grounds of rejection of claims 46, 47, 52, 55, 58, 61, 63, 65 and 67.¹

The appellants state that the claims stand or fall in the following groups: 1) claims 33, 34, 40, 41 and 44; 2) claims 46-48, 52, 55, 58 and 61; 3) claims 39 and 43, 4) claims 35-38, 42, 45, 51, 53, 54, 56, 57, 59, 60 and 62; 5) claims 64 and 66; and 6) claims 63, 65 and 67 (brief, page 5). We therefore limit our discussion regarding the affirmed rejections to one claim in each group, i.e., claims 33, 39, 45 and 66. See *In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR

¹ No new rejection is made of claim 48 which requires that the alloy contains about 0.2% In.

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§ 1.192(c) (7) (1997).

*Rejection over Linder in view of
Apostolos and the appellants' admitted prior art*

Claim 33

Linder discloses a sacrificial anode for cathodic corrosion protection, comprising about 0.01 to 1.0 wt% manganese, 0 to about 20 wt% zinc, and 0 to about 0.1 wt% indium, the balance being aluminum having an iron content of up to about 0.5 wt% (col. 1, lines 21-27).

Linder does not disclose the sacrificial anode in combination with a metal-reinforced concrete structure. However, the teaching that the sacrificial anode is for cathodic corrosion protection (col. 1, lines 6-8) would have fairly suggested, to one of ordinary skill in the art, use of the sacrificial anode in known cathodic protection applications. Such applications include protection of the metal reinforcement in a reinforced concrete structure as acknowledged by the appellants' ("aluminum-zinc alloys have been used for sacrificial cathodic protection of steel reinforcing in concrete"; specification, page 2, lines 1-2), and as disclosed by Apostolos (col. 2, line 55 - col. 3, line 4; col. 3, lines 33-37).

The appellants argue that their amount of indium is 10% higher than that of Linder (brief, page 8), i.e., the appellants

limit Linder's "about 0.1% by weight of indium" (col. 1, lines 24-25) to "0.1% by weight of indium". As stated by a predecessor of our reviewing appellate court: "In view of the flexibility in meaning of the term 'about,' however, we are not prepared to accept appellant's insistence that the example given in the Lenher patent of a pH value 'maintained at about 7.0' means maintenance at precisely 7. said to be the exact neutrality point." *In re De Vaney*, 185 F.2d 679, 683, 88 USPQ 97, 101 (CCPA 1950). Likewise, we do not interpret Linder's "about 0.1% by weight" as meaning "precisely 0.1% by weight". Linder expresses the upper limits of his ranges to, at most, two decimal places. Linder's "about 0.1% by weight", therefore, reasonably appears to include a percentage which is higher than 0.1 by one unit in the second position from the decimal point, i.e., 0.11% by weight. This is the lower limit of the percentage of indium required by the appellants' claims.

The appellants argue (brief, pages 8-9) that the following disclosure in Linder (col. 1, lines 45-50) teaches away from using more than 0.1 wt% indium: "The indium additive makes it possible to maintain the desired anode potential and high current efficiency. The additive is selected within the range 0.005-0.1% by weight, preferably 0.01-0.07% by weight, and most preferably

0.01-0.05% by weight. Higher amounts of indium have the opposite effect." Linder's teaching that the indium content can be about 0.1 wt% (col. 1, lines 24-25), however, would have indicated to one of ordinary skill in the art that the desired anode potential and high current efficiency would be obtained not only at the upper limit of 0.1 wt% set forth in this excerpt, but also at indium contents which are about 0.1 wt%, such as 0.11 wt%.

For the above reasons we conclude that the reinforced concrete structure claimed in the appellants' claim 33 would have been obvious to one of ordinary skill in the art over Linder and the prior art applied therewith.

Claim 39

The appellants argue that the "consisting essentially of" transition term in claim 39 excludes Linder's 0.01 to 1.0 wt% manganese because it would alter the basic and novel characteristics of the alloy recited therein (brief, page 17). The term "consisting essentially of" includes not only what is specifically recited in the appellants' claim, but also any other materials which do not materially affect the basic and novel characteristics of the claimed invention. See *In re Herz*, 537 F.2d 549, 551-2, 190 USPQ 461, 463 (CCPA 1976); *In re De Lajarte*, 337 F.2d 870, 873-4, 143 USPQ 256, 258 (CCPA 1964); *In re*

Janakirama-Rao, 317 F.2d 951, 954, 137 USPQ 893, 896 (CCPA 1963). The appellants' specification indicates that the basic and novel characteristic of the claimed reinforced concrete structure is that it comprises a sacrificial anode containing an alloy which enables the sacrificial anode to have a sufficiently low potential and to cause generation of a sufficiently large amount of electricity (specification, page 2, lines 15-19). Linder's exemplified alloy has a potential, relative to a saturated calomel electrode, of -1,090 to -1,118 mV, and an efficiency, measured at 82%, corresponding to 2,440 AH/kg (col. 2, lines 40-44). The corresponding values for the appellants' alloy are, respectively, as low as -1,000 mV or less, and as large as 1,500 AH/kg or more (specification, page 12, lines 1-3). The similarity of Linder's potential and efficiency to those of the appellants indicates that Linder's manganese would not materially affect the basic and novel characteristics of the appellants' claimed invention. Accordingly, we conclude that the reinforced concrete structure claimed in the appellants' claim 39 would have been obvious to one of ordinary skill in the art over Linder and the prior art applied therewith.

Claims 46-48, 52, 55, 58 and 61

The independent claims from which claims 46-48, 52, 55, 58

and 61 depend require that the alloy includes at least one of the following metals: Zr, Si, Ce, Ti and B. In the rejection of the independent claims the examiner relies upon JP '683, JP '637 and JP '128 for a suggestion to include these components in Linder's alloy. JP '683, JP '637 and JP '128, however, are not applied in the rejection of claims 46-48, 52, 55, 58 and 61. Also, the examiner has not explained how Apostolos or the appellants' admitted prior art would have fairly suggested, to one of ordinary skill in the art, including Zr, Si, Ce, Ti or B in Linder's alloy. Accordingly, we reverse the rejection of claims 46-48, 52, 55, 58 and 61.

Rejection over Linder in view of Apostolos, the appellants' admitted prior art, and JP '683, JP '128 or JP '637

Claim 45

JP '683 discloses an aluminum alloy sacrificial anode containing zinc and indium and teaches that 0.01-0.3 wt% Ti or 0.002-0.2 wt% B miniaturizes the casting structure, makes it uniform, and improves the surface solubility of the sacrificial anode (pages 7-8).

JP '637 discloses an aluminum alloy sacrificial anode containing zinc and indium and teaches that 0.05-0.3 wt% Si or 0.0005-0.1 wt% Zr increases the amount of electricity, 0.005-0.1 wt% Ti or 0.001-0.02 wt% B changes the crystal structure from

a coarse columnar crystal to a fine particle-shaped crystal, and makes the elution of the alloy uniform, so that pitting corrosion, groove corrosion and attachment of corrosive products are prevented.

JP '128 discloses an aluminum alloy sacrificial anode containing zinc and indium and teaches that 0.05-0.3 wt% Si increases the quantity of electricity generated, and that 0.005-0.1 wt% Ti or 0.001-0.02 wt% B changes the crystal structure from a coarse columnar crystal to a fine particle-shaped crystal, wherein the dissolve-out of alloy becomes uniform, and prevents pitting corrosion, groove corrosion and adherence of corrosive products (pages 5-7).

JP '683, JP '637 and JP '128 would have fairly suggested, to one of ordinary skill in the art, including Ti, B, Si and Zr in Linder's alloy to obtain the disclosed benefits of these components.

The appellants argue that JP '683, JP '637 and JP '128 do not cure the deficiency in Linder in that these references do not teach or suggest, in combination, about 20 to about 50 wt% zinc and from 0.11 to about 0.6 wt% indium (brief, page 20). Linder, however, discloses that the alloy can contain about 20 wt% zinc (col. 1, lines 23-24). As discussed above regarding the

rejection of claim 39, Linder would have fairly suggested, to one of ordinary skill in the art, including 0.11 wt% indium in the alloy.

The alloy claimed in the appellants' claim 45, therefore, would have been obvious to one of ordinary skill in the art over Linder in view of the prior art applied therewith.

Claim 66

JP '128 discloses an aluminum alloy sacrificial anode containing zinc and indium and teaches that 0.02-0.2 wt% Ce acts toward preventing pitting corrosion and increases the electric quantity (pages 5 and 7).

The appellants argue that Linder, Apostolos, the appellants' admitted prior art, JP '683, JP '637 and JP '128, in combination, fail to teach or suggest an alloy which contains about 20 to about 50 wt% zinc and from 0.11 to about 0.6 wt% indium (brief, page 20). Linder, however, discloses that the alloy can contain about 20 wt% zinc (col. 1, lines 23-24). As discussed above regarding the rejection of claim 39, Linder would have fairly suggested, to one of ordinary skill in the art, including 0.11 wt% indium in the alloy.

The appellants argue that the transition term "consisting essentially of" excludes Linder's 0.01-1.0 wt% manganese (brief,

page 22). This argument is not persuasive for the reason given above regarding the rejection of claim 39.

Accordingly, we conclude that the alloy claimed in the appellants' claim 66 would have been obvious to one of ordinary skill in the art over Linder and the prior art applied therewith.

*Rejections over Sakano and
the prior art applied therewith*

All of the appellants' claims require an alloy containing at least 0.11% indium. As indicated by the following disclosure, Sakano uses less than 0.1% indium (col. 2, lines 24-39):

It must be added that an alloy containing 0.1 percent or more of indium, or an alloy formed by adding zinc simultaneously with the said quantity of indium [sic], incurs a relatively high rate of self-corrosion when it is used as a galvanic anode, and its galvanic current efficiency does not exceed the range of 50 to 60 percent in the case wherein aluminum material of ordinary purity has been used in its alloying.

The aluminum alloy anode of the present invention containing less than 0.1 percent of indium as described above has a reduced quantity of added indium, which is a relatively high-priced metal, and not only affords, thereby, economy in cost, but also affords improvement of anode characteristics, particularly substantial improvement of galvanic current efficiency, which is highly advantageous in practical uses.

In response to the appellants' argument that Sakano teaches away from an alloy having an indium content of more than 0.1 wt% (brief, page 9), the examiner argues (answer, pages 7-8):

As is evinced by page 4, lines 10-15 of the instant specification that indium content could be as high as 0.6 wt.% without affecting said properties. Therefore, ordinary skill artisan is contemplated the indium content as taught by cited said references is not limited to the preferred embodiment as disclosed by cited references but includes the indium amount not affecting said properties, which is many folds higher than the claimed 0.11 wt% indium.

In making this argument the examiner is using the appellants' disclosure of their invention as prior art, which is improper. The examiner has imbued one of ordinary skill in the art with knowledge of the appellants' invention which is not disclosed in or suggested by the applied references. See *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). In doing so, the examiner has fallen "victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (quoting *Gore*, 721 F.2d at 1553, 220 USPQ at 312-13). Accordingly, we reverse the rejections over Sakano and the prior art applied therewith.

Rejection over JP '683

The appellants' claims 63, 65 and 67 require that the alloy includes 0.11 to about 0.6 wt% indium. JP '683, however, discloses an alloy containing 0.005-0.1 wt% indium and teaches that "if the amount is more than the upper limit, the current

efficiency improvement cannot be recognized, and the efficiency is lowered" (page 6).

The examiner argues that the ranges of the amounts of the appellants' components and those of JP '683 overlap (answer, page 6). There is no overlap, however, between the JP '683 indium range which ends at 0.1 wt% and the appellants' indium range which begins at 0.11 wt%. For this reason and because the examiner has not explained why, in view of the above-quoted teaching in JP '683 regarding an indium content upper limit of 0.1 wt%, one of ordinary skill in the art would have been led by JP '683 to use an indium content higher than 0.1 wt%, we reverse the rejection of claims 63, 65 and 67.

New grounds of rejection

Claims 46, 47, 61, 63 and 67 are rejected under 35 U.S.C. § 103 as being obvious over Linder in view of the appellants' admitted prior art, Apostolos, and JP '683, JP '637 or JP '128.

As discussed above regarding the rejection of claim 45, from which claims 46 and 47 depend, the alloy claimed in claim 45 would have been obvious to one of ordinary skill in the art over Linder in view of the appellants' admitted prior art, Apostolos, and JP '683, JP '637 or JP '128. Claims 46 and 47 each recite amounts of zinc and indium which the alloy must contain. In both

of these claims the amount of zinc can be as low as about 20% and the amount of indium can be as low as 0.11%. Linder teaches that the alloy can contain about 20 wt% zinc and about 0.1 wt% indium (col. 1, lines 23-25). Using 0.11 wt% indium in Linder's alloy would have been obvious to one of ordinary skill in the art for the reason given above regarding the rejection of claim 33.

Dependent claim 61, which depends from claim 60, claims an alloy comprising about 20% to about 30% Zn, 0.11% to about 0.5% In, about 0.005% to about 0.1% Ti, about 0.001% to about 0.02% B, and the balance Al. Independent claim 67 claims an alloy consisting essentially of from about 10% to about 50% Zn, 0.11% to about 0.6% In, about 0.005% to about 0.1% Ti, about 0.001 to about 0.02% B, and the balance Al. Adding the amounts of Ti and B recited in claims 61 and 67 to Linder's alloy would have been obvious to one of ordinary skill in the art in view of JP '683, JP '637 or JP '128 for the reason given above regarding the rejection of claim 45.

The alloy recited in claim 63, which consists essentially of about 10% to about 50% Zn, 0.11% to about 0.6% In, about 0.0005% to about 0.3% of at least one metal selected from Zr, Si, Ce, Ti, and B, and the balance Al, would have been obvious to one of ordinary skill in the art in view of JP '683, JP '637 or JP '128

for the reason given above regarding claim 45.²

Claim 52 is rejected under 35 U.S.C. § 103 as being obvious over Linder in view of the appellants' admitted prior art, Apostolos, and JP '637.

Dependent claim 52, which depends from claim 51, claims an alloy comprising about 20% to about 30% Zn, 0.11% to about 0.5% In, about 0.005% to about 0.05% Zr, and the balance Al. Adding this amount of Zr to Linder's alloy would have been obvious to one of ordinary skill in the art in view of JP '637 for the reason given above regarding the rejection of claim 45.

Claims 55 and 65 are rejected under 35 U.S.C. § 103 as being obvious over Linder in view of the appellants' admitted prior art, Apostolos, and JP '637 or JP '128.

Dependent claim 55, which depends from claim 54, claims an alloy comprising about 20% to about 30% Zn, 0.11% to about 0.5% In, about 0.05% to about 0.3% Si, and the balance Al. Independent claim 65 claims an alloy consisting essentially of about 10% to about 50% Zn, 0.11% to about 0.6% In, about 0.05% to about 0.3% Si, and the balance Al. Adding the amounts of Si recited in claims 55 and 65 to Linder's alloy would have been

² The "consisting essentially of" transition term does not distinguish claim 63 over Linder as discussed above regarding the rejection of claim 39.

obvious to one of ordinary skill in the art in view of JP '637 or JP '128 for the reason given above regarding the rejection of claim 45.³

Claim 58 is rejected under 35 U.S.C. § 103 as being obvious over Linder in view of the appellants' admitted prior art, Apostolos, and JP '128.

Dependent claim 58, which depends from claim 57, claims an alloy comprising about 20% to about 30% Zn, 0.11% to about 0.5% In, about 0.02% to about 0.2% Ce, and the balance Al. Adding this amount of Ce to Linder's alloy would have been obvious to one of ordinary skill in the art in view of JP '128 for the reason given above regarding the rejection of claim 45.

DECISION

The rejection under 35 U.S.C. § 103 over Linder in view of Apostolos and the appellants' admitted prior art is affirmed as to claims 33, 34, 39-41, 43, and 44 and reversed as to claims 46-48, 52, 55, 58 and 61. The rejection under 35 U.S.C. § 103 of claims 35-38, 42, 45, 51, 53, 54, 56, 57, 59, 60, 62, 64 and 66 over Linder in view of Apostolos, the appellants' admitted prior art, and JP '683, JP '128 or JP '637, is affirmed. The

³ The "consisting essentially of" transition term does not distinguish claim 65 over Linder as discussed above regarding the rejection of claim 39.

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rejections under 35 U.S.C. § 103 of claims 33, 34, 39-41, 43, 44, 46-48, 52, 55, 58 and 61 over Sakano in view of Apostolos and the appellants' admitted prior art, and claims 35-38, 42, 45, 51, 53, 54, 56, 57, 59, 60, 62, 64 and 66 over Sakano in view of Apostolos, the appellants' admitted prior art, and JP '683, JP '128 or JP '637, are reversed. The rejection of claims 63, 65 and 67 under 35 U.S.C. § 103 over JP '683 is reversed. New grounds of rejection of claims 46, 47, 52, 55, 58, 61, 63, 65 and 67 have been entered under 37 CFR § 1.196(b).

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b), by final rule notice, 62 Fed. Reg. 53, 131, 53, 197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides, "A new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

(b) Appellants may file a single request for rehearing within two months from the date of the original decision ...

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of

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the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner....

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record....

Should the appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED-IN-PART, 37 CFR § 1.196(b)

BRADLEY R. GARRIS)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
TERRY J. OWENS)	
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